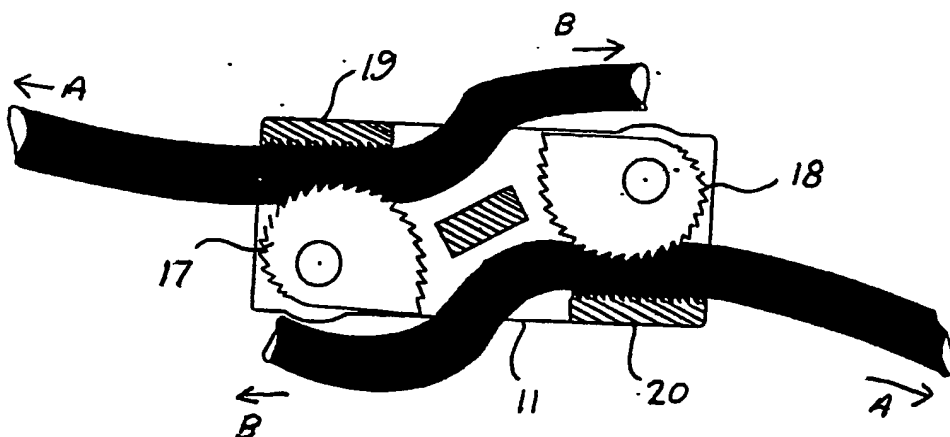




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(54) Title: AN APPARATUS FOR CONNECTING LENGTHS OF URETHANE CORD TOGETHER

**(57) Abstract**

An apparatus for connecting lengths of urethane cord together comprises a rectangular body portion (11) having cam wheels (17, 18) located at diagonally opposed corners and restraining members (19, 20) at the remaining corners. The restraining members (19, 20) are rectangular in shape and face cam wheels (17, 18) respectively. Portions of urethane cord are arranged to be placed between the spaces provided between each cam wheel (17, 18) and its opposed restraining members (19, 20) and are arranged to be pulled in the "A" direction. Teeth are provided on the inner face of the restraining members (19, 20) and on a major part of the periphery of the cam wheels (17, 18). By pulling each urethane cord in the "A" direction as shown, the cam wheels (17, 18) are turned to reduce the space between each cam wheel (17, 18) and its opposed restraining member (19, 20) until each portion of urethane cord is held tightly therebetween. By pulling the portions of urethane cord in the "B" direction shown they can be released.

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AN APPARATUS FOR CONNECTING LENGTHS
OF URETHANE CORD TOGETHER

TECHNICAL FIELD

The principal application of the present invention is
5 to the repair of surfboard legropes.

Once a surfboard legrope breaks, the common method for
repairing it is to tie the two broken ends together in a
knot. However, because of the elastic and slippery nature
of urethane, a common legrope material, it is almost
10 impossible to tie a suitable knot to join the two broken
ends of the urethane cord and therefore, the legrope must be
replaced.

DISCLOSURE OF THE INVENTION

According to the present invention there is provided an
15 apparatus for connecting portions of a flexible elongate
member together comprising a first and second cam surface
and a first and second restraining surface wherein a portion
of flexible elongate member is arranged to be held between
the first cam surface and first restraining surface and
20 another portion of flexible elongate member is arranged to
be held between the second cam surface and the second
restraining surface.

The first and second cam surfaces preferably are
located on first and second cam wheels respectively.

25 The first and second restraining surfaces preferably
are located on first and second restraining members
respectively.

It is preferred that the first and second cam surfaces
and restraining surfaces comprise teeth which are arranged
30 hold their respective portions of flexible elongate member.

It is preferred that the first and second restraining
surfaces lie opposite the first and second cam surfaces
respectively.

The restraining members are preferably fixed.

35 Preferably the first and second cam members are
supported on axles.

Preferably during a connecting process each portion of flexible elongate member is arranged to turn a respective one of the cam wheels in a manner which reduces the distance between each cam surface and its respective restraining surface.

The axles are preferably parallel and extend between side surfaces of the apparatus.

The axles of the cam members may be arranged to be held in grooves in the side surfaces of the apparatus.

According to one embodiment the grooves allow the axles and their respective cam wheels to be slid toward and away from their respective restraining surfaces.

Preferably the apparatus has a body portion which is substantially rectangular in shape.

Preferably the restraining surfaces are located at diagonally opposed corners of the body portion.

The restraining surfaces preferably extend parallel to the upper and lower surfaces of the body portion.

The grooves preferably extend parallel to the end surfaces of the body portion.

It is preferred that the portions of flexible elongate members are part of a single length of urethane cord which is used as legrope for surfboards.

According to one embodiment the body portion has lug portions which are arranged to facilitate its connection to an ankle strap.

Preferably stainless steel rings are used to attach the apparatus to an ankle strap in conjunction with the lugs.

BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 shows a sectional view of an apparatus for connecting together lengths of urethane cord; and

Figure 2 shows the apparatus connecting two lengths of urethane cord together.

MODES FOR CARRYING OUT INVENTION

Referring to Figure 1, the apparatus comprises a body portion 11 which is substantially rectangular in shape.

5 The body portion 11 comprises two side surfaces, only one of which is shown in Figure 1.

Each side surface 12 has vertical slots 13 and 14 at each end which are arranged to slidably support axles 15 and 16 of cam wheels 17 and 18.

10 At diagonally opposed corners at the upper left and lower right of the body portion 11, restraining members 19 and 20 are located. These are effectively rectangular members having saw-toothed horizontal inner surfaces 19a and 20a which are arranged perpendicular to slots 13 and 14 respectively.

15 The cam wheels 17 and 18 have saw-toothed cam surfaces 21 and 22 respectively around a major part of their peripheries and smooth straight surfaces 23 and 24 respectively around the remainder of their peripheries.

20 The cam wheels 17 and 18 may be turned on their axles so as to either increase or decrease the distance between the respective opposing restraining members 19 and 20.

By placing portions of urethane cord between the restraining member 19 and cam wheel 17 and the restraining member 20 and cam wheel 18 and pulling each portion of
25 urethane cord in the direction shown by the arrows A, cam wheels 17 and 18 respectively are turned by the action of the teeth of each cam wheel gripping its respective portion of urethane cord. The harder each portion of urethane cord is pulled, the further the respective cam wheels 17, 18 are
30 turned so that the distance between the restraining members 19, 20 and their opposing cam wheel saw-toothed surfaces is reduced.

Eventually, a stage will be reached at which point each portion of urethane cord is tightly held between respective
35 ones of the restraining members and cam wheels, thus providing a connection between the two portions of urethane

cord.

The portions of urethane cord may be released by pulling them in the direction indicated by the arrows B, thus reversing the action performed during a tightening operation described previously.

A separating member 25 is located at the centre of the apparatus between the cam wheels and serves to provide a partition which prevents separate portions of urethane cord from interfering with each other during a connection operation.

Although not shown, the apparatus may comprise lugs which allow it to be connected to an ankle strap by means of stainless steel rings or the like.

CLAIMS

1. An apparatus for connecting flexible longated members together comprising a first and second cam surface (21, 22) and a first and second restraining surface (19, 20) wherein a portion of flexible elongate member is arranged to be held between the first cam surface (21) and first restraining surface (19a) and another portion of flexible elongate member is arranged to be held between the second cam surface (22) and the second restraining surface (20a).

2. An apparatus according to claim 1 wherein the first and second cam surfaces (21, 22) are located on first and second cam wheels (17, 18) respectively.

3. An apparatus according to any claim 1 wherein the first and second restraining surfaces (19a, 20a) are located on first and second restraining members (19, 20) respectively.

4. An apparatus according to claim 2 wherein the first and second cam surfaces (21, 22) and the first and second restraining surfaces (19a, 19b) comprise teeth which are arranged to grip the portions of elongate member.

5. An apparatus according to claim 4 wherein each flexible elongate member is arranged to turn a respective one of the cam wheels in a manner which reduces the distance between each cam surface and its respective restraining surface.

6. An apparatus according to claim 4 wherein the cam wheels are supported on axles (15, 16) which are parallel and extend between side surfaces of the apparatus.

7. An apparatus according to claim 4 wherein the axles (15, 16) and their cam wheels (17, 18) are arranged to be held in grooves (13, 14) in the side surfaces of the apparatus.

8. An apparatus according to claim 7 wherein the grooves (13, 14) allow the axles (15, 16) to be slid toward and away from their respective restraining surfaces (19a, 20a).

9. . An apparatus according to claim 7 wherein the restraining surfaces (19a, 20a) are located at diagonally opposed corners of the apparatus.

5 10. An apparatus substantially as hereinbefore described with reference to the accompanying drawings.

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SUBSTITUTE SHEET

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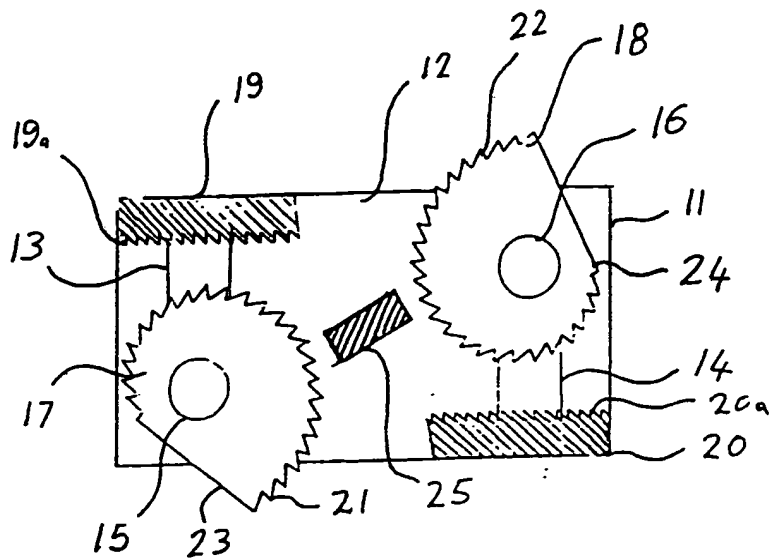


FIG 1

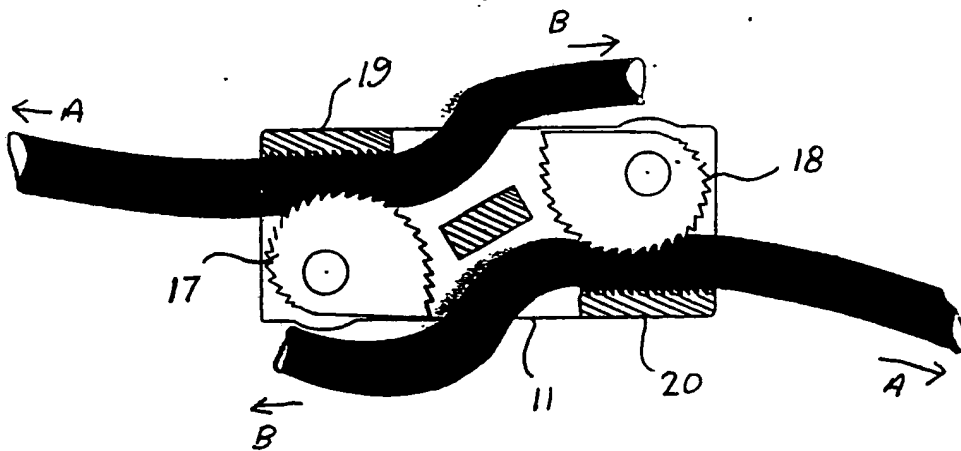
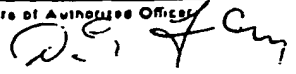
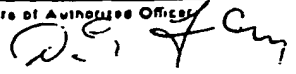
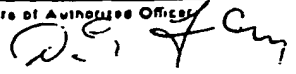


FIG 2

INTERNATIONAL SEARCH REPORT

International Application No PCT/AU 88/00280

I. CLASSIFICATION OF SUBJECT MATTER : <small>(Special classification symbols apply, indicate only)</small> According to International Patent Classification (IPC) or to both National Classification and IPC Int. Cl. ⁴ B65H 69/00, F16G 11/10																																																								
II. FIELDS SEARCHED Minimum Documentation Searched : Classification System Classification Symbols IPC B65H 69/00, F16G 11/10 Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched : AU : IPC as above																																																								
III. DOCUMENTS CONSIDERED TO BE RELEVANT* <table border="1"> <thead> <tr> <th>Category *</th> <th>Citation of Document, ** with indication, where appropriate, of the relevant passages **</th> <th>Relevant to Claim No. **</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>AU,A, 43122/58 (231741) (GESTER) 7 May 1959</td> <td>(1-3)</td> </tr> <tr> <td>Y</td> <td>(07.05.59)</td> <td>(4-9)</td> </tr> <tr> <td>X</td> <td>AU,A, 41131/72 (464191) (WATSON) 18 October 1973</td> <td>(1-3)</td> </tr> <tr> <td>Y</td> <td>(18.10.73)</td> <td>(4-9)</td> </tr> <tr> <td>X</td> <td>US,A, 3564664 (DAGE) 23 February 1971 (23.02.71)</td> <td>(1-3)</td> </tr> <tr> <td>Y</td> <td></td> <td>(4-9)</td> </tr> <tr> <td>X</td> <td>AU,A, 39989/72 (473990) (LACREX BREVETTI SA)</td> <td>(1,3)</td> </tr> <tr> <td>Y</td> <td>20 September 1973 (20.09.73)</td> <td>(2,4-9)</td> </tr> <tr> <td>Y</td> <td>AU,A, 16380/76 (521635) (FEDER) 2 February 1978</td> <td>(1-9)</td> </tr> <tr> <td></td> <td>(02.02.78)</td> <td></td> </tr> <tr> <td>Y</td> <td>AU,A, 22437/70 (465336) (AB GUSTAVSBERGS FABRIKER)</td> <td>(1-9)</td> </tr> <tr> <td></td> <td>25 May 1972 (25.05.72)</td> <td></td> </tr> <tr> <td>Y</td> <td>US,A, 4541149 (JENSEN) 17 September 1985 (17.09.85)</td> <td>(1-9)</td> </tr> <tr> <td>Y</td> <td>GB,A, 2181479 (LOWERY) 23 April 1987 (23.04.87)</td> <td>(1-9)</td> </tr> <tr> <td>Y</td> <td>EP,A, 148287 (BODEN) 17 July 1985 (17.07.85)</td> <td>(1-9)</td> </tr> <tr> <td>Y</td> <td>AU,A, 31339/63 (265722) (LAVIANO) 3 December 1964</td> <td>(1-9)</td> </tr> <tr> <td></td> <td>(03.12.64)</td> <td></td> </tr> </tbody> </table>			Category *	Citation of Document, ** with indication, where appropriate, of the relevant passages **	Relevant to Claim No. **	X	AU,A, 43122/58 (231741) (GESTER) 7 May 1959	(1-3)	Y	(07.05.59)	(4-9)	X	AU,A, 41131/72 (464191) (WATSON) 18 October 1973	(1-3)	Y	(18.10.73)	(4-9)	X	US,A, 3564664 (DAGE) 23 February 1971 (23.02.71)	(1-3)	Y		(4-9)	X	AU,A, 39989/72 (473990) (LACREX BREVETTI SA)	(1,3)	Y	20 September 1973 (20.09.73)	(2,4-9)	Y	AU,A, 16380/76 (521635) (FEDER) 2 February 1978	(1-9)		(02.02.78)		Y	AU,A, 22437/70 (465336) (AB GUSTAVSBERGS FABRIKER)	(1-9)		25 May 1972 (25.05.72)		Y	US,A, 4541149 (JENSEN) 17 September 1985 (17.09.85)	(1-9)	Y	GB,A, 2181479 (LOWERY) 23 April 1987 (23.04.87)	(1-9)	Y	EP,A, 148287 (BODEN) 17 July 1985 (17.07.85)	(1-9)	Y	AU,A, 31339/63 (265722) (LAVIANO) 3 December 1964	(1-9)		(03.12.64)	
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IV. CERTIFICATE <table border="1"> <tr> <td> Date of the Actual Completion of the International Search 7 October 1988 (07.10.88) </td> <td> Date of Mailing of this International Search Report 21 OCTOBER 1988 (21.10.88) </td> </tr> <tr> <td> International Searching Authority Australian Patent Office </td> <td> Signature of Authorised Officer  D.G. FRY </td> </tr> </table>			Date of the Actual Completion of the International Search 7 October 1988 (07.10.88)	Date of Mailing of this International Search Report 21 OCTOBER 1988 (21.10.88)	International Searching Authority Australian Patent Office	Signature of Authorised Officer  D.G. FRY																																																		
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Patent Family Members

US 3564664	DE 1625856	GB 1214143		
AU 16380/76	BR 7605006	CA 1062885	DE 2534474	
	DK 3432/76	FR 2319817	GB 1546553	
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